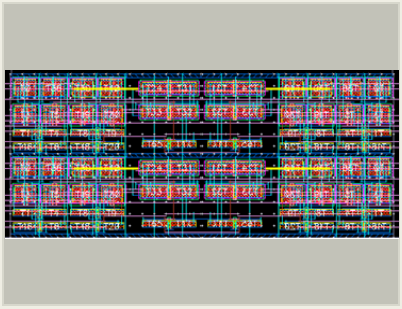
Audio ADC, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

With the availability of small geometry SOI processes, STI has shown that it is possible to design and fabricate improved high performance, analog circuits with excellent rad-hard characteristics using Rad-Hard by Design and Process (RHBD and RHBP) techniques. STI has demonstrated rad hard design techniques by designing circuits using several SOI process for Phase I SBIRs including projects for the Air Force, the Navy and DARPA. STI proposes to use these proven techniques to demonstrate the feasibility of developing a Rad-hard ADC with 48ksps and 18 bit resolution using a 40nm SOI process from GlobalFoundries. The proposed architecture that Silicon Technologies Inc. proposes to implement, is a single loop, fifth order, Sigma Delta Modulator with a five bit Flash ADC for the quantizer. Designing analog circuits which are immune to radiation environments is difficult as ionizing radiation and even single ionizing particles can generate charges in semiconductor circuits. Previous research at STI successfully concentrated on the invention of an improved method to design rad-hard analog circuits called ADONIS. ADONIS is a structured approach which uses a cell matrix method where the designer places symbols representing circuit elements at locations that give optimum analog performance critical for small geometries. This allows a designer to view the schematic and layout simultaneously with immediate access to circuit parameters for SPICE simulations. In addition STI will use a new technique for maximizing the throughput of small geometry circuits for Ebeam Direct Write (EBDW). This new design technology called "1D" was invented by Dr. Michael Smayling, presently a consultant for STI. STI has developed an analog extension to the technology, Straight Line Analog, which will be used in this project. This technology has the benefit of providing EBDW at significantly smaller cost than previous whole wafer EBEAM in addition to improved manufacturing uniformity.



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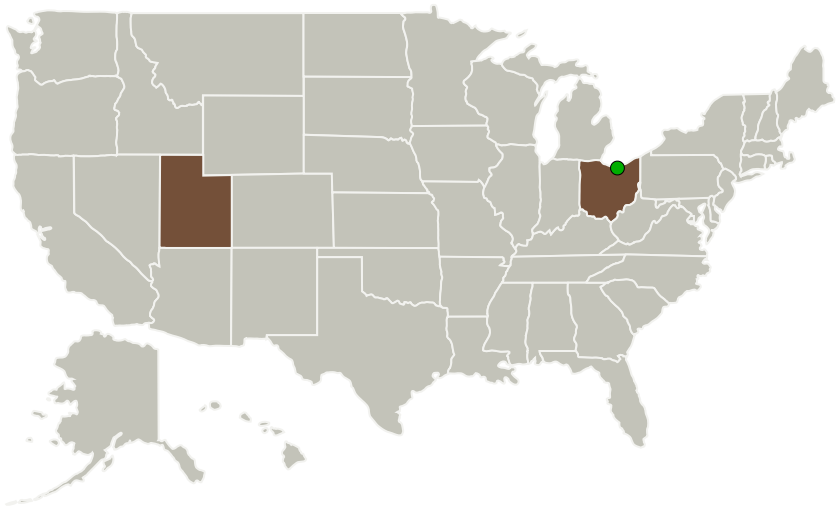
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Silicon Technologies, Inc.	Lead Organization	Industry	Holladay, Utah
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Utah

Project Transitions

June 2015: Project Start

December 2015: Closed out

Closeout Summary: Audio ADC, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138829)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Silicon Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

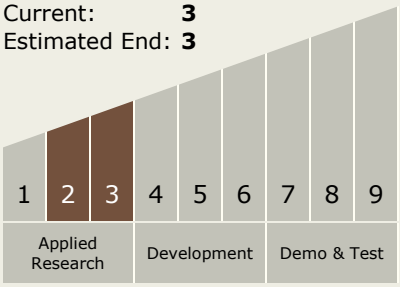
Carlos Torrez

Principal Investigator:

Tracy Johancsik

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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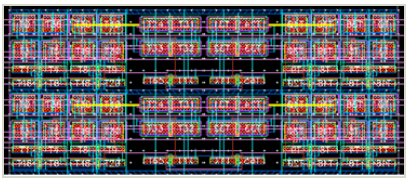
Images



Briefing Chart Image
Audio ADC, Phase I
(https://techport.nasa.gov/image/133905)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.2 Extravehicular Activity Systems
    - TX06.2.3 Informatics and Decision Support Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System